

1. A thermoformable polyurethane foam formed from a composition comprising:

an isocyanate-containing component having an average isocyanate functionality less than or equal to 2.15;

5 an active hydrogen-containing component having an average functionality less than or equal to 2.14;  
a catalyst; and  
a surfactant.

2. The foam of claim 1, wherein the active hydrogen-containing component has an average functionality greater than or equal to 2.065.

3. The foam of claim 1, having a thermoformability factor greater than or equal to 0.5.

4. The foam of claim 1, having a recovery factor greater than or equal to 0.4.

5. The foam of claim 1, having a room temperature compression set resistance of less than or equal to 10% after 50% compression for 22 hours.

6. The foam of claim 1, having a 50°C compression set resistance of less than or equal to 30% after 50% compression for 22 hours.

7. The foam of claim 1, having a thermoformability factor greater than or equal to 0.6, a recovery factor greater than or equal to 0.5, and a room temperature compression set resistance of less than or equal to 10% after 50% compression for 22 hours.

8. The foam of claim 1, having a thermoformability factor greater than or equal to 0.6, a recovery factor greater than or equal to 0.5, a room temperature compression set resistance less than or equal to 10%, and a 50°C compression set resistance of less than or equal to 30% after compression to 50% for 22 hours.

9. The composition of claim 1, wherein the active hydrogen-containing component comprises a polyol.
10. The composition of claim 9, wherein the polyol is a mixture of a polyether polyol and a polyester polyol.
11. The composition of claim 9, wherein the polyester polyol is selected from the group consisting of aromatic polyesters and caprolactone-based polyesters.
12. The composition of claim 9, wherein the polyether polyol is selected from a group consisting of polypropylene ether based polyether triol.
13. The composition of claim 9, wherein the polyether polyol is selected from a group consisting of a mixture of polypropylene ether based polyether triol and diol.
14. The composition of claim 13, further comprising a moisture management system.
15. The composition of claim 1, wherein the average functionality of the isocyanate-containing component is 1.80 to 2.10.
16. The composition of claim 1, wherein the average functionality of the isocyanate-containing component is 2.00 to 2.05.
17. The composition of claim 1, wherein the average functionality of the isocyanate-containing component is 2.00.
18. The composition of claim 1, further comprising a moisture management system.

19. The composition of claim 18, wherein the moisture management system is selected from the group of additives consisting of sodium carboxymethylcellulose, poly(N-vinyl acrylamide), sodium acrylate, potassium acrylate, wood powder, corn starch, calcium carbonate, and mixtures comprising one of the foregoing additives.
20. The composition of claim 19, wherein the moisture management system is selected from the group of additives consisting of sodium carboxymethylcellulose, poly(N-vinyl acrylamide), calcium carbonate, and mixtures comprising one of the foregoing additives.
21. A multi-layer polyurethane foam composite comprising:  
a layer of a thermoformable polyurethane foam; and  
a layer of a polyurethane foam different from the thermoformable foam, wherein the different polyurethane foam is disposed on and in intimate contact with the thermoformable polyurethane foam.
22. The composite of claim 21, wherein the layers are integrally bonded by wet-on-wet or wet-on-dry casting.
23. The composite of claim 21, wherein the thermoformable polyurethane foam layer, the different polyurethane foam layer, or both, comprise a moisture management system.
24. The composite of claim 23, wherein the moisture management system is selected from the group of additives consisting of sodium carboxymethylcellulose, poly(N-vinyl acrylamide), sodium acrylate, potassium acrylate, wood powder, corn starch, calcium carbonate, and mixtures comprising one of the foregoing additives.
25. The composition of claim 24, wherein the moisture management system is selected from the group of additives consisting of sodium carboxymethylcellulose, poly(N-vinyl acrylamide), calcium carbonate, and mixtures comprising one of the foregoing additives.

26. A composite polyurethane comprising a layer of a thermoformable polyurethane foam formed from a composition comprising:

an isocyanate component having an isocyanate functionality of 2.00 to 2.05;

an active hydrogen-containing component having an average hydrogen functionality of less than or equal to 2.14;

a surfactant and

a catalyst,

wherein the layer of thermoformable polyurethane foam is adhered or laminated to a non-thermoformable material.

27. The composite of claim 26, wherein the active hydrogen-containing component has an average hydrogen functionality of greater than or equal to 2.065.

28. The composite of claim 26, wherein the non-thermoformable material is a polyurethane foam.

29. The composite of claim 26, wherein the thermoformable polyurethane foam layer comprises a moisture management system.

30. The composite of claim 26, wherein the moisture management system is selected from the group of additives consisting of sodium carboxymethylcellulose, poly(N-vinyl acrylamide), sodium acrylate, potassium acrylate, wood powder, corn starch, calcium carbonate, and mixtures comprising one of the foregoing additives.

31. The composite of claim 30, wherein the moisture management system is selected from the group consisting of sodium carboxymethylcellulose, poly(N-vinyl acrylamide), calcium carbonate, and mixtures comprising one of the foregoing moisture management systems.

32. A shoe insert comprising the foam of claim 1.

33. A shoe insert comprising the foam of claim 21.

34. A shoe insert comprising the foam of claim 26.

FOOTWEAR